Claims

1. A process for separating ethyl or methyl ester fraction enriched in EPA (eicosapentaenoic acid, C20:5) and a free fatty acid fraction enriched in DHA (docosahexaenoic acid, C22:6) obtained from a direct esterification of fish oil free fatty acids with a ethanol or methanol using lipase, by molecular distillation.

2. A process according to claim 1, wherein the fish oil free fatty acid starting material is obtained by a lipase catalysed alcoholysis of fish oil triglycerides, a subsequent molecular distillation and hydrolysis of the residual glyceride mixtures.

3. A process for esterifying a marine oil composition containing EPA and DHA as C_n alkyl esters of fatty acids (n = 2-18) to form (1): a C_n alkyl ester fatty acid fraction (n = 2-18) enriched in DHA as compared to the starting material and a C_m alkyl ester fatty acid fraction (m = 1-12; n > m) enriched in EPA as compared to the starting material, or (2): a C_n alkyl ester fatty acid fraction (n = 2-18) enriched in both DHA and EPA as compared to the starting material and a C_m alkyl ester fatty acid fraction (m = 1-12; n > m) lower in both DHA and EPA as compared to the starting material comprising the step of reacting said marine oil composition with a C_m alcohol (m = 1-12; n > m) in the presence of a lipase catalyst under essentially organic solvent-free conditions, and separating the fractions by molecular distillation.

4. A process according to claim 3, wherein the starting material, C_2-C_{18} alkyl ester, is obtained by a lipase catalysed alcoholysis of fish oil triglycerides, a subsequent molecular distillation, and alcoholysis of the residual glyceride mixture with a C_2-C_{18} alkyl alcohol.

5. A process according to claim 3 and 4, wherein the C_2-C_{18} alkyl ester is hexyl ester.

6. A process according to claim 3, wherein the C_1-C_{12} alcohol is ethanol.

7. A process according to claim 3, were said lipase catalyst is Rhizomucor miehei lipase (MML), Thermomyces lanuginosa lipase (TLL), Psedomonas sp. lipase (PSL) or Psedomonas fluorescens lipase (PFL).

8. A process according to claim 1, wherein the molar ratio of methanol or ethanol to free fatty acids in the starting composition is from 0.5 to 10.0.

9. A process according to claim 8, wherein the molar ratio is from 0.5 to 3.0.

10. A process according to claim 8, wherein the molar ratio is from 1.0 to 2.0.

11. A process according to claim 8, wherein the molar ratio is from 0.5 to 1.5.

12. A process according to claim 3, wherein the molar ratio of C_1-C_{12} alcohol to C_2-C_{18} alkyl ester is from 0.5 to 10.0.

13. A process according to claim 12, wherein the molar ratio is from 0.5 to 3.0.

14. A process according to claim 12, wherein the molar ratio is from 2.0 to 3.0.

15. A process according to any preceding claim, wherein the esterification reaction is conducted at a temperature of 0°C to 70°C.

16. A process according to claim 15, wherein the esterification reaction is conducted at a temperature of 20°C to 40°C.

17. A process according to any preceding claim, wherein said lipase catalyst is immobilized on a carrier.

18. A process according to claim 1, wherein said lipase catalyses the alcoholysis of DHA at a much slower speed than the corresponding alcoholysis of EPA.

19. A process according to claim 18, wherein said lipase catalyst is *Rhizomucor miehei* lipase (MML) or *Thermomyces lanuginosa* lipase (TLL).